

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): ~~An active learning method~~ A label prediction method for predicting a label value of unknown data using a storage device for storing a set of known data and a set of unknown data, and a plurality of learning machines, said known data being data having known label values, and said unknown data being data having unknown label values, said method comprising ~~the steps of:~~

(a) sampling, using said plurality of learning machines, sampling the known data from said storage device independently of one another, and thereafter to learn learning the known data;

(b) integrating and delivering output results of said plurality of learning machines as a result of the learning;

(c) retrieving, using said plurality of learning machines, retrieving the unknown data from said storage device to make a prediction of a label value of said unknown data by using the results of the learning machines;

(d) calculating and selecting delivering data to be next learned based on the result of the prediction of the label value of the unknown data;

(e) entering a label value corresponding to the selected data to be next learned; and

(f) deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data,

wherein the method further comprises performing at least one of: (i) non-uniform weighting of the known data at the time of sampling the known data; (ii) non-uniform weighting of the results of the learning machines at the time of integrating the results of the learning by said plurality of learning machines; and (iii) non-uniform weighting of the data to be next learned at

~~the time of selecting the data to be next learned based on non-uniform weighting is performed at least one of when the known data is sampled, when the results of the learning by said plurality of learning machines are integrated, and when the data to be next learned is calculated from the predictions by said plurality of learning machines.~~

2. (currently amended): The label prediction~~active learning~~ method according to claim 1, further comprising ~~the step of~~ dividing the known data and the unknown data into groups, wherein data are selected to disperse over groups when the data to be next learned is calculated.

3. (currently amended): The label prediction~~active learning~~ method according to claim 1, further comprising ~~the step of~~ dividing the known data and the unknown data into groups, wherein the unknown data are supplied to said each learning machine such that the unknown data disperse over groups.

4. (currently amended): ~~An active learning system~~A label prediction system for predicting a label value of unknown data comprising:

a storage device for storing a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

a plurality of learning machines for learning the known data and predicting the unknown data;

a plurality of sampling devices provided for each of said learning machines for sampling the known data from said storage device and supplying the sampled data to said learning machines corresponding thereto;

first integrating means for integrating results of learning performed by said respective learning machines based on the known data;

second integrating means for ~~calculating~~ selecting data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning machines ~~based on the unknown data~~, and delivering the data to be next learned;

result input means for entering a label value corresponding to the data to be next learned;

control means for deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data; and

sampling weighting means for setting a weight at the time of sampling for each of said sampling devices,

wherein said learning machines learn the known data supplied from the sampling devices and predict the label values of the unknown data using the results of the learning.

5. (currently amended): ~~An active learning system~~ A label prediction system for predicting a label value of known data comprising:

a storage device for storing a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

a plurality of learning machines for learning the known data and predicting the unknown data;

a plurality of sampling devices provided for each of said learning machines for sampling the known data from said storage device and supplying the sampled data to said learning machines corresponding thereto;

first integrating means for integrating results of learning performed by said respective learning machines based on the known data;

second integrating means for ~~calculating~~ selecting data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning machines ~~based on the unknown data~~, and delivering the data to be next learned;

result input means for entering a label value corresponding to the data to be next learned;
control means for deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data; and

prediction weighting means for setting weights for use by said first integrating means to integrate the results of learning,

wherein said learning machines learn the known data supplied from the sampling devices and predict the label values of the unknown data using the results of the learning.

6. (currently amended): The label prediction~~active learning~~ system according to claim 4, comprising prediction weighting means for setting weights for use by said first integrating means to integrate the results of learning.

7. (currently amended): The label prediction~~active learning~~ system according to claim 4, comprising data weighting means for setting weights for use by said second integrating means to select data to be next learned.

8. (currently amended): The label prediction~~active learning~~ system according to claim 4, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

9. (currently amended): The label prediction~~active learning~~ system according to claim 4, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

10. (currently amended): ~~An active learning system~~A label prediction system for predicting a label value of unknown data comprising:

a storage device for storing a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

a plurality of learning machines for learning the known data and predicting the unknown data;

a plurality of sampling devices provided for each of said learning machines for sampling the known data from said storage device and supplying the sampled data to said learning machines corresponding thereto;

first integrating means for integrating results of learning performed by said respective learning machines based on the known data;

second integrating means for ~~calculating~~selecting data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning machines ~~based on the unknown data~~, and delivering the data to be next learned;

result input means for entering a label value corresponding to the data to be next learned;

control means for deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data; and

data weighting means for setting weights for use by said second integrating means to select data to be next learned,

wherein said learning machines learn the known data supplied from the sampling devices and predict the label values of the unknown data using the results of the learning.

11. (currently amended): The label prediction~~active learning~~ system according to claim 10, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

12. (currently amended): The label prediction~~active learning~~ system according to claim 10, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

13. (currently amended): ~~An active learning system~~ A label prediction system for predicting a label value of unknown data, comprising:

a storage device for storing a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

a plurality of learning machines for learning the known data and predicting the unknown data;

a plurality of sampling devices provided for each of said learning machines for sampling the known data from said storage device and supplying the sampled data to said learning machines corresponding thereto;

first integrating means for integrating results of learning performed by said respective learning machines based on the known data;

second integrating means for ~~calculating~~ selecting data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning machines ~~based on the unknown data~~, and delivering the data to be next learned;

result input means for entering a label value corresponding to the data to be next learned;

control means for deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data; and

group generating means for performing grouping of the known data and the unknown data,

wherein said learning machines learn the known data supplied from the sampling devices and predict the label values of the unknown data using the results of the learning, and

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

14. (currently amended): ~~An active learning system~~ A label prediction system for predicting a label value of unknown data, comprising:

a storage device for storing a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

a plurality of learning machines for learning the known data and predicting the unknown data;

a plurality of sampling devices provided for each of said learning machines for sampling the known data from said storage device and supplying the sampled data to said learning machines corresponding thereto;

first integrating means for integrating results of learning performed by said respective learning machines based on the known data;

second integrating means for ~~calculating~~selecting data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning machines ~~based on the unknown data~~, and delivering the data to be next learned;

result input means for entering a label value corresponding to the data to be next learned;

control means for deleting the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data;

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups,

wherein said learning machines learn the known data supplied from the sampling devices and predict the label values of the unknown data using the results of the learning.

15. (currently amended): A computer program product for causing a computer to perform label prediction for predicting a label value of unknown data~~active learning~~, said computer program product including a computer readable medium bearing software instructions for enabling said computer to perform predetermined operations comprising:

storing, using a storing means, a set of known data and a set of unknown data, said known data being data having known label values, and said unknown data being data having unknown label values;

sampling, using a plurality of learning means, the known data from said storage means, and learning the known data and predicting the unknown data;

integrating, using a first integrating means, results of learning performed by said respective learning means based on the known data;

~~selecting~~calculating, using a second integrating means, data to be next learned from results of the predictions of the label value of the unknown data performed by said respective learning means~~based on the unknown data~~, and delivering the data to be next learned;

entering, using a result input means, a label value corresponding to the data to be next learned;

deleting, using a control means, the data, the label value of which has been entered, from the set of unknown data, and adding the data to the set of known data; and

setting, using a weighting means, at least one of: weights during the sampling in said sampling device; weights for use by said first integrating means; and weights for use by said second integrating means,

wherein said learning means learn the known data sampled from said storage means and predicts the label values of the unknown data using the results of the learning.

16. (previously presented): The computer program product according to claim 15, said predetermined operations further comprising performing, using a group generating means, grouping of the known data and the unknown data, wherein data are selected such that the data disperse over groups when said second integrating means calculates the data to be next learned.

17. (previously presented): The computer program product according to claim 15, said predetermined operations further comprising:

performing, using a group generating means, grouping of the known data and the unknown data; and

supplying, using a data selecting means, said each learning machine with the unknown data such that the unknown data disperse over groups.

18. (canceled).

19. (currently amended): The label prediction~~active learning~~ system according to claim 6, comprising data weighting means for setting weights for use by said second integrating means to select data to be next learned.

20. (currently amended): The label prediction~~active learning~~ system according to claim 6, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

21. (currently amended): The label prediction~~active learning~~ system according to claim 6, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

22. (currently amended): The label prediction~~active learning~~ system according to claim 7, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

23. (currently amended): The label prediction~~active learning~~ system according to claim 7, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

24. (currently amended): The label prediction~~active-learning~~ system according to claim 19, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

25. (currently amended): The label prediction~~active-learning~~ system according to claim 19, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

26. (currently amended): The label prediction~~active-learning~~ system according to claim 5, comprising data weighting means for setting weights for use by said second integrating means to select data to be next learned.

27. (currently amended): The label prediction~~active-learning~~ system according to claim 5, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

28. (currently amended): The label prediction~~active learning~~ system according to claim 5, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

29. (currently amended): The label prediction~~active learning~~ system according to claim 26, further comprising group generating means for performing grouping of the known data and the unknown data,

wherein said second integrating means selects data such that the data disperse over groups upon calculation of the data to be next learned.

30. (currently amended): The label prediction~~active learning~~ system according to claim 26, further comprising:

group generating means for performing grouping of the known data and the unknown data; and

data selecting means for supplying said each learning machine with the unknown data such that the unknown data disperse over groups.

31. (canceled).

32. (canceled).

33. (new): The label prediction method according to claim 1, further comprising repeating (a) to (f);

wherein the set of known data to which the data, the label value of which has been entered, is added in (f) is used in (a) as the known data, and

wherein the set of unknown data from which the data, the label value of which has been entered, is deleted in (f) is used in (c) as the unknown data.